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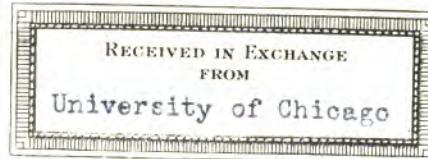
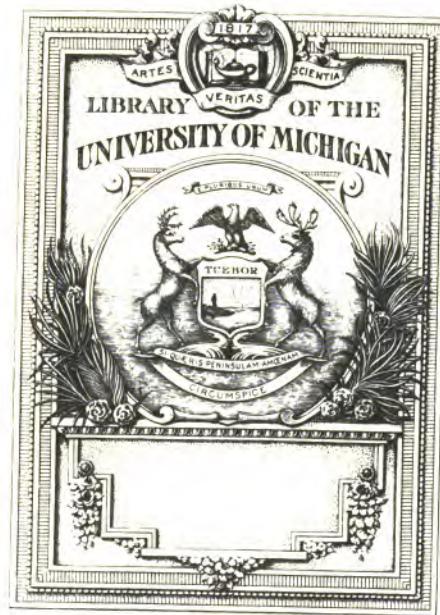
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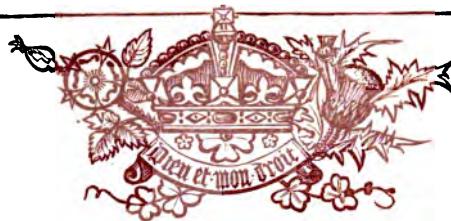
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*PAPERS OF THE CONFERENCES*

*Held in connection with Pt. III, no. 7,*

*The GREAT INTERNATIONAL  
FISHERIES EXHIBITION*

MOLLUSCS, MUSSELS

WHELKS, ETC.

USED FOR FOOD OR BAIT

BY

CHARLES HARDING

OF KING'S LYNN

DUP. U. & C.

LONDON

WILLIAM CLOWES AND SONS, LIMITED  
INTERNATIONAL FISHERIES EXHIBITION  
AND 13 CHARING CROSS, S.W.

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*International Fisheries Exhibition*

LONDON, 1883

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## International Fisheries Exhibition.

LONDON, 1883.

THURSDAY AFTERNOON, JUNE 21ST, 1883.

THE Chair was taken at 2 o'clock by Mr. TYSSEN-AMHERST, M.P., who briefly introduced Mr. CHARLES HARDING, of King's Lynn, to the Congress.

### MOLLUSCS, MUSSELS, WHELKS, ETC., USED FOR FOOD OR BAIT.

*Whelks.*—The Lynn fishery supplies about 20,000 bags, or 1,250 tons of Whelks a year, nearly all of which are used for human food. The average amount paid for them before the expense of boiling and carriage is about £10,000.

Whelks are caught in whelk-pots, which are small round baskets about 1 foot in diameter, with a hole in the top, through which the Whelk crawls, and is unable to return. These pots are sunk in from 5 to 30 fathoms of water, and baited with Crabs, Haddock, and other fish.

The following places are the principal sources of supply:—Saltfleet, about 20 miles from Grimsby; Sheringham, by Cromer; Lynn Deeps, Docking Channel, Blakeney Coast, Wells, Boston Deeps, Brancaster, Thornham, and Hunstanton.

The Great Grimsby fishery supplies about 150,000 wash of Whelks annually. A wash contains 21 quarts and a pint, and the average price for the season would run about 3s. a wash, or a total of £22,500.

It is supposed that out of the 150,000 wash caught, not more than 6,000 wash are eaten; the other 144,000 are used for bait by vessels engaged in catching Cod, Ling, and Haddocks, each vessel using on an average voyage 45 wash, which in fine weather they would use in four days. The Grimsby smacks engaged in catching Whelks are fitted with wells, into which the Whelks are put after being first placed in nets; by this means they are kept alive, as they are almost useless for bait when dead.

The vessels used in catching Whelks are from 15 to 30 tons register, and some of the better ones cost from £600 to £700 each.

Most of the Whelks caught by Lynn smacks are sent to London for human food.

The edible Whelk is considered a very nutritious and strengthening food, and is always free from poisonous matter. I have heard fishermen say that a dish of Whelks does them as much good as a beefsteak.

I am indebted to Mr. D. Barnard, of Lynn, and Mr. W. G. Marshall, of Great Grimsby, for the above statistics concerning the Whelk.

I consider the only legislation necessary for the protection of Whelks is that the fishermen should return to the sea all Whelks less than  $1\frac{3}{4}$  inch in length.

*Mussels.*—The most important mollusc, both for food and bait, is the Mussel.

In British waters, spatting usually takes place in the spring, and does not appear to be at all dependent on warm weather. On December 7th, 1877, I examined some of the embryo taken from a spatting Mussel with a microscope, and found it to have a reddish appearance, and about the five-hundredth part of an inch in diameter. It would not polarize, so I conclude the shell was not formed.

On the 12th December, 1879, I found large quantities of Mussels to contain similar embryos, the weather at the time being very severe. On December 3rd, 1880, I found the same. The winters of 1879-80 and 1880-1 were exceptionally cold, so that it appears they are not dependent on "heat and tranquillity" for their proper development.

On the 25th of May, 1879, after a very severe winter of about nine weeks' continuous frost, I found on one of the beds under my charge several acres of brood Mussels, about the tenth of an inch in length. In the spring of the year 1879, and the spring of 1880, overwhelming quantities of brood were found on the scalps on the east coast of England, which might be measured by hundreds of acres. There has not been a fall of spat since.

I found a few Mussels containing spat this year as late as the 3rd June; they appear to spat every year, but the spat does not always attach itself to the beds. It is probably carried away by the tides.

Where Mussel brood is found in thick and dense masses, they will be three years before they are what is called sizeable, that is, two inches in length; but instances are found near low-water mark where a few have become isolated, and have grown much more rapidly.

I do not think that Mussels will spat, or rather that the spat will mature, in partially-salt water. The only places where I have ever seen any young brood is where the water has the same degree of saltiness as the outside sea, which on the east coast of England has a density of about  $1026\frac{1}{2}$ ; distilled water being 1000. Although it appears that salt water is necessary at their birth, brackish water is better adapted for fattening and growing, provided they are covered with the tide at high water. I find by experience that the most suitable degree of saltiness of the water for

fattening purposes is where the density of the water is about 1014. This likewise applies to the fattening of Oysters.

To save the bulk of the spat when free is the great object of Mussel culture ; therefore it is imperative to have the ground of the natural sea bed as free from sand, weeds, and mud as possible, so that the young may have some clean hard substance to which it can attach itself. Ascidians and sponges are very destructive to the young Mussel, as they cover the culch, which would otherwise be favourable for their attachment.

Mussels have a great many natural enemies, amongst which may be mentioned the Star-fish or Five-finger, the Dog-whelk (*Purpura lapillus*), the Sea Urchin or Echinus, sea birds, Danish crows, and sometimes rats ; but Star-fish deal the most wholesale destruction. I have known ten acres of a thickly-covered scalp to be almost denuded in a fortnight. Last summer I had carted from beds under my control between two and three hundred tons of this fish. The Star-fish will always attack small Mussels in preference to those of larger growth. It first grasps the Mussel with its five fingers, and when it opens slightly to breathe and feed, it inserts its stomach, or part of it, into the body of the Mussel, when I believe digestion commences, and the Mussel dies and opens its shell, and the Star-fish withdraws its stomach with the meat of the Mussel. This operation I have seen performed in all its stages thousands of times, upon Oysters, Mussels, and Cockles.

The Dog-whelk bores a hole in the shell of the Mussel, about the size of a small pin-head, and destroys it.

The Sea Urchin also bores a hole in the shell of the Mussel, but much larger than the Dog-whelk, the hole being about the size of a sixpence. This very rarely

occurs. I have only seen three instances, and that on large Mussels near low-water mark.

Sea birds, Danish crows, and rats break the shell and devour the Mussel.

I consider the best and only way that existing natural Mussel beds can be properly cultivated and protected, is to make them the actual property of some one. If they are allowed to be fished indiscriminately, they will quickly become exhausted, as has been the case with hundreds of natural scalps on the coast.

Fifty years ago Mussels were very prolific on the East Coast of England, and almost every small harbour had its natural scalp outside, which fed the "lays" or fattening grounds inside, to the great profit of the owners of such lays. About that period some ill-starred individual discovered they were valuable for manure, when commenced a raid on the scalps, which is the origin of their present downfall. I can remember, as a boy, seeing hundreds and thousands of tons brought to land and sold to the farmers for manure, at three-halfpence a bushel.

An Act was passed by Parliament in 1868, called "The Sea Fisheries Act, 1868," which enables the Board of Trade to grant provisional orders to corporations and private individuals to regulate Oyster and Mussel fisheries; but the result, so far, has been very unsatisfactory. The reports of Mr. H. Cholmondeley Pennell, and Mr. W. E. Hall, two of the Inspectors of Fisheries, on the Oyster and Mussel fisheries, at eighteen different stations, show the beds to be worked in a very unsatisfactory manner.

Mr. Hall reports in 1877, that the Boston Corporation undertook to regulate the fishing in Boston Deeps in the year 1870, so as to maintain the supply. The Oyster beds, he states, remain in the state of denudation which charac-

terised them in 1869. The supply of Mussels, however, seems to be rapidly diminishing, from the persistent poaching of the fishermen, and from want of power of the Corporation under their "order" to close a sufficient portion of the ground every year. A similar "order" was granted to the Corporation of King's Lynn, in 1872. Mr. Hall reports on this "order" that the Corporation system of management in regard to Mussels is dangerous to the permanent welfare of the fishery; whilst as regards Oysters, the order is not carried into effect.

Under clause 4 of the order, the Corporation is compelled to keep open for fishing two-thirds of the area of the Oyster and Mussel beds, thus leaving a large proportion of the whole in a great measure at the mercy of the fishermen; and Mr. Hall justly points out the danger the Mussel beds of the Wash are necessarily exposed to from this provision.

When a Mussel bed is opened by either of the above-mentioned Corporations, a day is fixed, and duly advertised, and at 12 o'clock at night, scores of boats commence taking the Mussels, some by tons, and some only by a few bushels. The next day the markets are glutted with small Mussels, and in some instances I have known them to be unsaleable. Even at the best they only make very small prices; whereas, if they had been gradually sent to the various markets, good prices would have been made.

I am the lessee of about eleven miles of sea-beach on the Norfolk Coast, belonging to Hamon Le Strange, Esq., whose title to the proprietary right descends from a grant made in the eleventh century by William II. to William d' Albini, his butler.

The fishing on this beach consists of Mussels, Cockles, Clams, Winkles, and a few Oysters.

When I hired the fishing, eight years ago, there was not one ton of Mussels on the whole eleven miles. I appointed watchers, enforced a close time, cleaned the ground, and endeavoured to keep off poachers, but with very indifferent success. Mr. Le Strange, in 1879, applied to the Board of Trade for the grant of an order for the establishment and maintenance of a joint Oyster and Mussel fishery, under the powers of "The Sea Fisheries Act, 1868," so as to provide a better protection for the fishery. The Board of Trade sent an inspector down to hold an enquiry as to the proposed order, and in June this year the order received the Royal assent, rather more than four years after the first application, at a cost of several hundred pounds, owing to the Board of Trade refusing to define the boundary of an adjacent fishery to which they had previously granted an order.

This order will greatly benefit the long-line fishermen off the coasts of Northumberland and the South of Scotland, as I have special railway rates to all the ports on these coasts, and can afford, when I have any Mussels, to deliver them at a reasonable price for bait. The importance of Mussels for bait to these deep-sea line boats is incalculable.

Mr. P. Wilson, late Her Majesty's Fishery Officer at Eyemouth, in Scotland, reports that in one week the boats from Burnmouth, Coldingham and Eyemouth used for baiting their long lines, sixty-one tons of Mussels. They landed, with this quantity of Mussels, 25,620 stone of Haddocks, besides a considerable quantity of Cod and Whiting, and got for the fish 1s. 8d. per stone, equal to about £2,500. Observe, in one week alone, sixty-one tons of Mussels were used at these three fishing-stations for bait, the cost of which was about £160, the produce in fish

from which was 25,620 stone, worth £2,500. Mr. Wilson also reports that when the fishermen are unable to obtain Mussels, they have had to bait their lines in many instances with bullock's liver, and be content with half a catch of fish.

The greatest trouble I have in protecting my Mussel beds is from a class of men who call themselves fishermen, but who are half farm labourers and half fish hawkers, and are the scum of the villages bordering on the coast. I have lost from two to three thousand tons of Mussels in one year by these men, which would otherwise have gone to Scotland to be used as bait by real fishermen. All of this might have been prevented had the Board of Trade granted a provisional order for this fishery when requested. Taking Mr. Wilson's figures, that sixty-one tons of Mussels will catch £2,500 worth of Haddocks, Cod, and Whiting, one thousand tons of Mussels would catch about £41,000 worth of fish.

Mr. John Doull, who succeeded Mr. Peter Wilson as Her Majesty's Inspector of Fisheries at Eyemouth, writes to me on the 31st of May last as under:—

“I am not aware of any of the fishermen in this quarter using Whelks as bait. At some places on this coast Whelks are gathered and despatched to inland towns for food.

“Limpets are, however, collected in large quantities, and used by our fishermen on their lines along with Mussels.

“Fishermen inform me that Mussels will keep alive for three hours in water after they are taken out of the shell, but speedily die when placed on the hook.

“To increase the supply of Mussels, I think that leases of suitable portions of foreshores should be granted to

persons who may be desirous of cultivating Mussels thereon, for which no rent should be charged until it would be seen whether the venture would be successful.

“The cultivation of the Mussels to be subject to the supervision of a Government Inspector, to see that it is properly attended to.

“The supply of Mussels to our line fishermen is of vital importance to them. For instance, here in Eyemouth alone, where twenty-eight boats, manned by seven men each, prosecuted the line fishing for Haddock from October last until now, no less than 920 tons of Mussels were used by them in that period, costing nearly £1,800 to the fishermen, about one-half of which sum was expended on the carriage of the Mussels.

“These twenty-eight boats grossed on an average for the season upwards of £600 each, still the item of Mussels bulked largely in their expenditure.

“The 28 Eyemouth boats shot their lines 2825 times during the fishing season ended May 1883; each boat carries 7 men and 7 lines, but on Mondays 10½ lines; each line is 1200 yards long, so that the total length of lines that passed through the fishermen’s hands during the season was 15,200 miles, or a length that would extend to about two-thirds the circumference of the earth.

“Every day the boats proceeded to sea they shot 135 miles of lines, and on Mondays 202 miles. On each line there are 1050 hooks, and every time the boats were at sea 205,800 hooks, baited with 411,600 Mussels, were put into the sea. The total number of Mussels used during the season, averaging two for each hook, was 46,819,500: exclusive of this enormous quantity of Mussels a good deal of Limpets were used, and also some bullock’s liver. Nearly all the Mussels come from the Wash or the

Boston Deeps ; a very insignificant portion was from New-haven and Ireland.

"No better fishermen than the Eyemouth men are to be found anywhere ; they are noted for their industry, perseverance, and energy, and I certainly do not know of more hardworking fishermen on the Scotch coast than those of Eyemouth.

"The white fishing trade seems to be undergoing a great revolution in consequence of the steam trawlers.

"Yours faithfully,

"JOHN DOULL."

I consider that, where natural beds of Mussels have once existed, and the ground has not altered, there new Mussel beds may be established and cultivated ; but the Government must grant provisional orders to persons desirous and willing to take in hand the cultivation of Mussels and Oysters, and not allow the officials at the Board of Trade to prevent the granting of such orders. The orders must enforce heavy penalties on persons illegally taking the molluscs, and provide for the imprisonment of those people who are unable to pay the fines and costs, as the greatest amount of poaching is done by the impecunious inhabitants of the villages adjacent to the shore, and whose forefathers a hundred years ago were the wreckers and smugglers of that age. Illegally taking Oysters and Mussels from such a fishery should be felony.

Mussels are largely cultivated on the continent. The exports from Antwerp for Paris alone, as recorded in the "Halles Centrales" Statistics for the season of 1873 amounted to seven million francs (£280,000). This represents the produce of natural beds and scalps unimproved by man's care.

In the town of St. Valery-sur-Somme, in France, artificial breeding, rearing, and fattening of Mussels, upon principles akin to those which obtain in ostreaculture, is carried on, and the success attained is such as to be worthy of a record in the history of attempts made to utilise the unbounded wealth of food lying ready to man's hand along the sea-shore. Lines of wattled stakes, averaging 530 yards in length, are driven in the sand close to the fair-way, just above low water-mark. These *bouchots de grand flot*, as they are called, extend over twenty-five acres. They serve for fixing the spat, which is floated up to them by the tidal currents, and constitute a collecting ground for brood, which are afterwards removed into shallow tanks of about fifty acres, dug out high on the strands between the tide marks. They are puddled with clay, and fitted with sluice-gates. The salt water in these tanks is slightly admixed with soft river water. They also serve as nurseries for the young Mussels, which hang in clusters and gather on wattles. When they attain proper size for transplanting, they are removed into the *parc*, where they will grow and develop into marketable Mussels. All this is being successfully carried out by M. Lemaire, who obtained from the French Government, in 1873, leave to appropriate a small strip of 40 acres of the foreshore fringing the low sandy estuary of the Somme. The success of this short experiment was so marked, that after an official visit paid by the Minister of Marine, and a number of *savants*, including M. Coste, who had predicted a failure, the original concession was extended to 620 acres.

There are numerous other places on the Continent of Europe where Oyster and Mussel culture is successfully carried on.

The secret of the whole matter is, where Mussel and

Oyster culture has proved successful, that the person undertaking the same has obtained a concession from the Government to work the beds exclusively himself, and has not been hampered by other persons claiming a right to fish on his grounds ; in other words, fishings are worked in precisely the same way as farms, where the farmer sows his seed, and at the proper season reaps his corn.

In England the laws allow the seed to be sown and protected to a certain extent, and when the molluscs are a certain size (*i.e.*, two and-a-half inches for Oysters, and two inches for Mussels), the whole world is free to come and fish on the beds by taking out a nominal licence, which is at the rate of 3s. 6d. per ton on the burden of the smack for one year, or 9d. per ton per month. This applies only to fisheries worked under the "Sea Fisheries Act, 1868."

To make the Oysters and Mussels the actual property of some private individual or body corporate appears at first sight to be rather hard on the so-called fishermen ; but it must be borne in mind that any person who undertakes to properly cultivate a portion of the foreshore for the increase of Oysters and Mussels must be in a position to expend a certain amount of capital, and therefore he would not very probably do much manual labour, but confine his energies to the employment of watchers or water bailiffs, to the making of "lays" or "parcs," by digging large reservoirs between tide marks, and the various other expenses contingent upon the enterprise ; so that the supply of molluscs would be greatly increased, and the fisherman or labourer employed would have more work than he has under the present exhausted state of things.

Under the "Orders" granted to the Corporations of Lynn and Boston for the cultivation of Oysters and Mussels, they have collectively jurisdiction over 229 square miles in

the Wash ; and I have no hesitation in saying that, if the Mussel beds in this area were properly worked, they are capable of supplying with bait the whole of the long-line fisheries of the country.

To catch the Mussel spat I have tried rows of wattled stakes placed in different positions on the beds as in France, but I found that they became covered with a green weed in a very short time, and were therefore unable to receive the spat.

I found that rows of stakes or blocks of cliff stone placed on the scalp remained free from weed and gathered the spat.

Mussels are used very largely for food in London, Manchester, Birmingham, Nottingham, Leicester, and other towns, the supplies coming from the Wash, Morecambe Bay, Devonshire, and large quantities from Bruinisse in Zeeland.

The Mussel is admitted on all hands to be the most deadly bait for salt-water fish, and from experiments I have made I believe the reason to be attributable to its tenacity to life. A Mussel taken from its shell and suspended on a hook in sea-water will be alive in two days. I am aware that fishermen are under the impression that they die shortly after being placed on the hook, but that such is not the case I am certain ; the microscopic movement of the cilia on the four gills or branchiae may be overlooked by a fisherman, but undoubtedly this lifelike movement is appreciated by the fish, and causes the Mussel to be the most deadly of baits.

The Mussel beds on the east coast of England are capable of supplying with bait the whole of the line fishing. The method of obtaining this bait up to the present has been for the Mussels to be sent from the Wash and other

places by rail and by fishing smacks, in the winter time when they are wanted. The railway rates to the Northumberland and south Scotch ports vary from 20s. to 23s. 4d. a ton; in addition to this there is the cost of carting from the natural scalps, some distance to the nearest station.

I consider a great improvement might be made upon this by selecting suitable sites on the foreshores of the estuaries in the north of England and the firths of Scotland, and sending the Mussels to the north during the summer months, as small steamers, which will not run in the winter, will take them to the north for about 8s. to 10s. a ton during the summer months. This would decrease the cost of Mussels to the fishermen at least 20s. a ton.

## DISCUSSION.

Mr. EARLL (of the United States Commission) said he had enjoyed the paper very thoroughly, and had gathered much valuable information from its details. He could see that it had required very careful research to collect the information which it contained. He was not specially familiar with the shell-fish fisheries of Great Britain, but, as he understood it, one of the principal objects of these Conferences was a presentation of facts which would be valuable to foreigners in regard to the fisheries of Great Britain, and, on the other hand, of facts in regard to other countries, which would be useful to the inhabitants of Great Britain. They had learned, during the morning discussion, of certain fishes that might be of importance to Great Britain, which had not yet been introduced, and of others which, though already introduced, were regarded as decidedly injurious, and it seemed to him that one of the principal objects to be attained was definite information

on these points. He had recently learned from Captain Danewig, of Norway, that the soft clam (*Mya arenaria*) was very abundant on that coast, but that was not used either for bait or as food. He inferred that the same species was abundant on the British Coast—if he were mistaken on this point he should be glad to be corrected, but he thought the inference was that there were large quantities. In the United States they made very little use of mussels, although there were large quantities of them: the fishermen did not use them for bait, and the people, excepting a few in the vicinity of New York, knew nothing of their value as food. They substituted the soft clam, of which the people of Norway and Great Britain had not yet learned the value. Since coming into the room, he had hastily put together a few facts concerning the extent to which this species was used in the States. In the State of Maine 318,000 bushels, or 1,000,000 lbs. of this mollusk were used for bait and for food. In Massachusetts an equal quantity, if not more, and in the middle states 406,000 bushels, making in all over 1,000,000 bushels, having a value to the fishermen of \$458,000. He had not the statistics for Connecticut, Rhode Island, and some of the other States where these shell-fish were also used in considerable quantities, but including them it might be said that over 1½ million bushels, valued at probably not less than \$600,000, were used on the Atlantic sea-board. Some fishermen on the coast confined themselves to the quarrying, as it was called, of these shell-fish, for they had the habit of burying themselves two or three inches deep in the mud or sand of the shallow bays along the shore. This industry afforded employment to a large number of fishermen at a time when there was nothing else to be done. Some of the smaller vessels, not considered

safe to encounter the winter gales, were taken into the shallow waters, where they served as hotels and work-houses for the men engaged in quarrying the clams. These men spent two or three months in gathering a vessel load, shelling and salting them, to be sold in the early spring to the vessels engaged in the great ocean cod fisheries ; whilst large numbers were also engaged, during the entire summer, gathering them to be sold in the larger markets for food, where they were prized very highly, not only by the labouring classes, but by the best people of the country. It appeared to him that the people of Europe had at their doors a large resource wholly undeveloped, and he should be very glad if, by calling attention to this question, he should in any way assist in adding to the stock of food, or to the readiness with which fishermen might procure bait.

Dr. DAY said he had made some inquiries with regard to the mussel fisheries last year when in H.M.S. *Crichton* on the east coast of Scotland. It had been suggested by Mr. Harding that the mussel beds should be granted to private individuals to work, because if they were left open to the fishermen they would work them out until nothing was left. But then a difficult question came forward. If these mussel beds were granted to private individuals, how were the fishermen to get their bait ? They complained that when mussels were in the hands of private individuals, the charge was so great that they could not get bait for fishing. If any or all of these beds in one locality were given to a private individual under Government supervision, it ought to be on the distinct understanding that the mussels were forthcoming at a certain price, not a prohibitive one, and that the fishermen could have them at any time.

Mr. SAVILLE KENT had listened with great interest to this Paper, and thought the statistics would be of the utmost service; he also felt indebted to Mr. Earll for his notice of soft clam, which there was no doubt did exist abundantly on the coast of England, and might be utilised as it was on the coast of France. There were also half a dozen other species on the east coast, and which might be equally utilised as the food of man. They were mostly bivalve molluscs, and amongst them might be mentioned the bastard oyster, which was generally considered an enemy to the other oysters, because it filled up the places where they were cultivated. It was used, however, on the south coast of France, and might be equally used here. There was also the *Donax pentaculus* and *Venus mercenaria*, and the razor shell, which were all estimable food, and were appreciated on the coast of France and most parts of America.

Professor BROWN GOODE said the remarks of his colleague, Mr. Earll, about the distribution of the soft shell food clam, and the manner of its capture, reminded him of a subject which was frequently proposed for discussion at the debating societies and schools in America, viz., Is digging clams fishing or agriculture? It was the fact that along the entire coast of New England the agricultural population in many instances derived half their support in digging, with hoes and shovels, clams of various species. Mr. Earll had spoken of the *Mya arenaria*, but there was another species on the coast equal in abundance, the round clam, called also by the Indian name quahang, and sometimes called the wampum clam, because it was the shell from which the Indians made money; broken fragments of the shell were strung on bits of skin, and used as a medium of exchange. Then the *Venus mercenaria* also occurred

everywhere from Cape Cod to Florida. Its production was almost equal in extent to most other species. Mr. Earll had estimated the value of the soft shell clam at about \$700,000, and he thought the production of the round clam must be equal, or nearly so. When small it was considered a great delicacy on the dinner-table in the summer months when oysters were not in season. He was led to refer to this species from the fact that Mr. F. G. Moore, Curator of the Liverpool Museum, placed in his hands the other day a paper in which he described a successful experiment of the introduction of this round clam into the waters of the St. George's Channel, and he hoped it would take root here and become useful. There was another species closely resembling this, the sea clam, or hen clam (*Macter solidissima*). It was also abundant on the sandy shoals, and afforded bait to fishermen to something like \$30,000 or \$40,000 a year. This also might be introduced with advantage in the North Sea. Many species in America, as, for instance, the mussel, the whelk, the cockle, and the little *littarina* (the common name of which he did not know), were exceedingly abundant, but were not gathered by fishermen to any extent. He had great pleasure in moving the vote of thanks to Mr. Harding for his Paper.

Alderman SMETHURST (Grimsby) had great pleasure in seconding the motion. He said he was aware of the difficulty of blending instruction and entertainment together to the satisfaction of an audience, and this seemed to be more a question to be reasoned out amongst a number of gentlemen practically acquainted with it in Conference, than to be talked about in a General Assembly. Speaking of bait, they all knew what was most suitable for their own localities in fishing, and the bait used differed considerably

in different localities. In some parts they used mussels for fishing along shore within sixty or seventy miles of land, but when they got beyond that they used different kinds of fish for different seasons. When they got on to what was called the "shawl" of the Dogger Bank, in the spring of the year, when the fish began to accumulate in the warm weather, they used whelks, when they went down at the fall of the year to the north end of the Dogger deeper water, they began to use lamprey eels along with whelks, to assist in catching two or three kinds of fish which harboured there; as they extended further across the sea the bait was changed again, according to the season of the year, and the depth, and the clearness or thickness of the water. In some parts they used lamprey eels for clear water, but when they got to about two hundred miles away, they then took what they considered a different class of bait to fish in deeper water. There they caught cod, ling, halibut, skate, and haddock. The bait used was lampreys, as a rule, and later on herrings. In clear water the herring was the most suitable fish; in thick water they used whelk bait, on account of the smell, which attracted the fish when they could not see it. In the summer time, when on what they call the Little Fisher Bank, they used herring principally for taking large halibut and ling. At this particular time of year they were fishing close to the coast of Norway on the stony ground, a place which he and his two sons opened out four years ago. They were now on the ground using mackerel for taking halibut weighing from 7 lbs. up to 16, 18, and 20 stone. They used vessels carrying 6 and 7 tons of ice each, and they were employed for seven or eight months in the year. Grimsby might be considered the largest fishing port in England. It received upwards of 100,000 tons of fish in a

year. The whole of this was not sent into the country for food, but part of it was used for bait, whilst a great part came to London, Manchester, Liverpool, Birmingham, and the large manufacturing towns. It was very right that this shell-fish should have every care and culture, and should not be allowed to be wantonly destroyed, because fishermen must have bait before the fish could be caught, and if the brood of the mussel were destroyed, and the whelks, the amount of fish caught would be greatly affected, and if it even became scarce and dear, people would have to pay a greater price for the fish they eat. The great cry everywhere now was how to get cheap fish into London, and that was a question to which he had devoted all his energy for the last thirty years, and had given his opinion when on the Commission which sat in London some three years ago.

The motion having been put and carried,

Mr. HARDING in reply, having thanked the Congress for the manner in which the Paper had been received, said there were few clams in England. On the coast which he hired, of about five miles, the men did not get a dozen in a day. With regard to the restrictions of price, he could only say that he had several thousand tons of mussels suitable for bait, and could not dispose of them at any price.

Mr. BIRKBECK, M.P., then moved a vote of thanks to Mr. Tyssen-Amherst for presiding. He felt specially indebted to him, being the representative of one division of his own county, where this question was one of great importance.

Mr. TOLLEMACHE, M.P., in seconding the vote of thanks, said, although there had not been so large a meeting as he had hoped, there had been a most interesting discussion.

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